GYANSHREE SCHOOL
ACADEMIC SESSION: 2025-26
PERIODIC TEST III
GRADE – X

Set -1

Roll No: 1 2

Q.P. Code no:1/1/1

Candidates must write the code on the title of the answer-book

STANDARD MATHEMATICS (041)

Time allowed: *3 hours* | *Maximum Marks: 80*

- Please check that this question paper contains **10** printed pages.
- Q.P. Code number given on the right hand side of the question paper should be written on title page of the answer book by the candidate.
- Please check that this question paper contains **38** questions.
- Please write down the serial number of the question in the answer book before attempting it.
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 8:15 am. From 8:15 am to 8:30 am, the candidates will read the question paper only and will not write any answer on the answer book during this period.

General Instructions:

Read the following instructions very carefully and follow them:

(i). This Question paper contains 38 questions. All questions are compulsory.

(ii). This Question paper contains - five sections A, B, C, D and E. Each section is compulsory.

(iii) In Section – A questions number 1 to 18 are Multiple Choice Questions (MCQs) and question number 19 & 20 are Assertion-Reason based questions of 1 mark each.

(iv) In Section - B questions number 21 to 25 are Very Short Answer (VSA) type questions, carrying 2 marks each.

(v) In Section - C questions number 26 to 31 are Short Answer (SA) type questions, carrying 3 marks each.

(vi)In Section - D questions number 32 to 35 are Long Answer (LA) type questions, carrying 5 marks each.

(vii) In Section - E question number 36 to 38 are Case Study based questions carrying 4 marks each.

(viii)There is no overall choice. However, an internal choice has been provided in 2 questions in Section - B, 2 questions in Section - C, 2 questions in Section – D.

(ix) Draw neat diagrams wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.

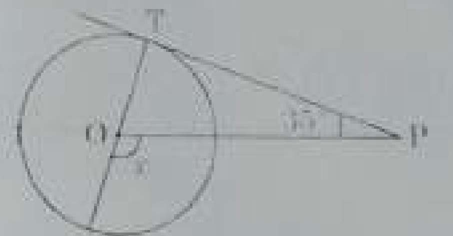
SECTION A

This section consists of 20 questions of 1 mark each.

Q1. The sum of the exponents of the prime factors in the prime factorisation of 196, is 1

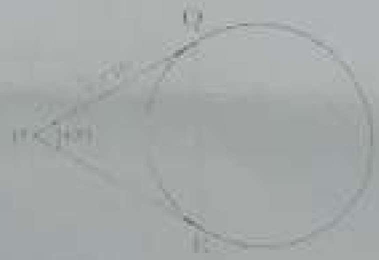
(a) 1 (b) 2
(c) 4 (d) 6

Q2. In the given figure, if PT is a tangent to a circle with centre O and $\angle TPO = 35°$, then the measure of $\angle x$ is 1



(a) 110° (b) 115°
(c) 120° (d) 125°

Q3. In the given figure, PQ and PR are tangents to the circle such that PQ = 7 cm and $\angle RPQ = 60°$. The length of the chord QR is 1



(a) 5 cm (b) 7 cm
(c) 9 cm (d) 14 cm

Q4. Two dice are rolled together. The probability of getting sum of numbers on the two dice as 2, 3 or 5, is 1

(a) $\frac{7}{36}$ (b) $\frac{11}{36}$
(c) $\frac{5}{36}$ (d) $\frac{4}{9}$

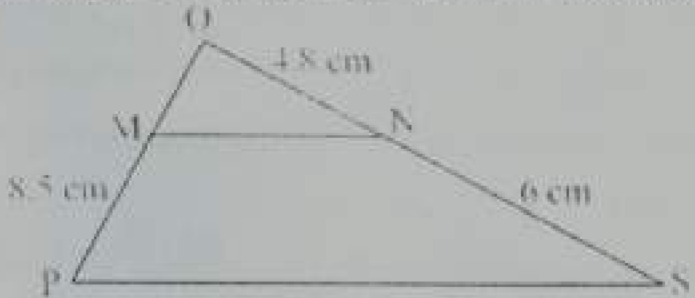
Q5. If the sum of the roots of the equation $x^2 - x = \lambda(2x - 1)$ is zero, then λ = 1

(a) -2 (b) 2
(c) $-\frac{1}{2}$ (d) $\frac{1}{2}$

If α, β are the zeros of the polynomial $f(x) = x^2 - 1(x + 1) - 1$ such that $(\alpha + 1)(\beta + 1) =$ 1

(a) 1
(b) 0
(c) -1
(d) 2

Q7. In the given figure, if M and N are points on the side OP and OS respectively of triangle OPS, such that MN ∥ PS, then the length of OP is 1



(a) 6.8 cm
(b) 17 cm
(c) 15.3 cm
(d) 9.6 cm

Q8. If α and β are the zeroes of the polynomial $x^2 - 1$, then the value of $(\alpha + \beta)$ is 1

(a) 2
(b) 1
(c) -1
(d) 0

Q9. A solid sphere is cut into two hemispheres. The ratio of the surface areas of sphere to that of two hemispheres taken together, is 1

(a) 1:1
(b) 1:4
(c) 2:3
(d) 3:2

Q10. The pair of equations $ax + 2y = 9$ and $3x + by = 18$ represent parallel lines, where a, b are integers, if 1

(a) $a = b$
(b) $3a = 2b$
(c) $2a = 3b$
(d) $ab = 6$

Q11. $\cos^4 A - \sin^4 A$ is equal to 1

(a) $2\cos^2 A + 1$
(b) $2\cos^2 A - 1$
(c) $2\sin^2 A - 1$
(d) $2\sin^2 A + 1$

Q12. If $\Delta ABC \sim \Delta DEF$, AB = 6 cm, DE = 9 cm, EF = 6 cm and FD = 12 cm, then the perimeter of ΔABC is: 1

(a) 28 cm
(b) 28.5 cm
(c) 18 cm
(d) 23 cm

Q13. If the sum of n terms of an A.P. is $2n^2 + 5n$, then its nth term is

(a) 4n-3 (b) 3n - 4

(c) 4n + 3 (d) 3n + 4

Q14. XY is drawn parallel to the base BC of a Δ ABC cutting AB at X and AC at Y. 1
If AB = 4 BX and YC = 2 cm, then AY =

(a) 2 cm (b) 4 cm

(c) 6 cm (d) 8 cm.

Q15. If the first, second and last term of an A.P. are a, b and 2a respectively, its sum is 1

(a) $\frac{ab}{2(b-a)}$ (b) $\frac{ab}{b-a}$

(c) $\frac{3ab}{2(b-a)}$ (d) 5ab/(a – b)

Q16. If $\cos\theta = \frac{3}{4}$, then find the value of $9\tan^2\theta + 9$ is 1

(a) 16 (b) 24

(c) 20 (d) 18

Q17. If the probability of a player winning a game is 0.79, then the probability of his losing the same game is 1

(a) 1.79 (b) 0.31

(c) 0.21% (d) 0.21

Q18. If $\sin\theta + \sin^2\theta = 1$, then $\cos^2\theta + \cos^4\theta =$ 1

(a) - 1 (b) 1

(c) 0 (d) 2

DIRECTIONS: In the question number **19** and **20**, a statement of **Assertion (A)** is followed by a statement of **Reason(R).** Choose the correct option out of the following:

(a) Both Assertion (A) and Reason (R) are true; and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

(c) Assertion (A) is true, but Reason (R) is false.

(d) Assertion (A) is false, but Reason (R) is true.

Q19. Assertion (A): The tangents drawn at the end points of a diameter of a circle are parallel. 1

Reason (R): Diameter of a circle is the longest chord.

Assertion (A): $4x + 3y = 12$ is a line which is parallel to $8x + 6y = 48$. 1
Reason (R): The graph of linear equation $ax = b$, where $a \neq 0$ is parallel to x –axis.

SECTION - B

In this section, there are 5 questions of 2 marks each.

1.(a) If α and β are the zeros of the quadratic polynomial $f(x) = x^2 - 2x + 3$, then find a polynomial whose roots are $\frac{\alpha - 1}{\alpha + 1}, \frac{\beta - 1}{\beta + 1}$. 2

OR

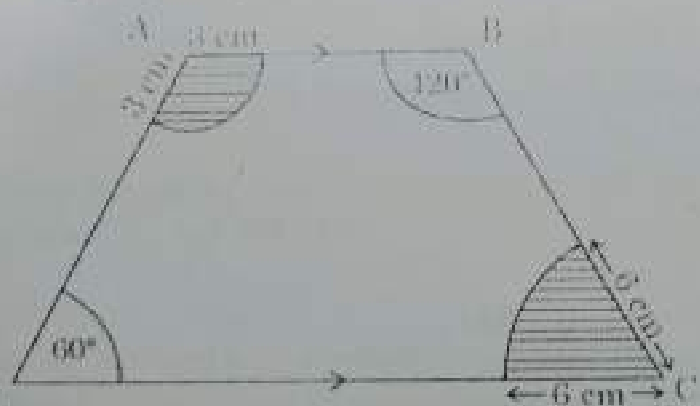
(b) Find the discriminant of the quadratic equation $4x^2 - 5 = 0$ and hence comment on the nature of the roots of the equation. 2

22.(a) A rectangular courtyard is 18 m 72 cm long and 13 m 20 cm broad. It is to be paved with square tiles of the same size. Find the least possible number of such tiles. 2

OR

(b) What is the greatest possible speed at which a man can walk 52 km and 91 km in an exact number of hours? 2

Q23. In the given figure, ABCD is a trapezium with AB∥DC. Find the area of the shaded region. (Keep the answer in terms of π) 2



Q24. If A (1, 2), B (4, 3) and C (6, 6) are the three vertices of a parallelogram ABCD, then find the coordinates of fourth vertex D. 2

Q25. A chord is subtending an angle of 90° at the centre of a circle of radius 14 cm. Find the area of the corresponding minor segment of the circle. 2

This section consists of 6 questions

Q26. The government rescued 100 people after train accident. Their ages were recorded in the following table. Find the mean age by step deviation method. 3

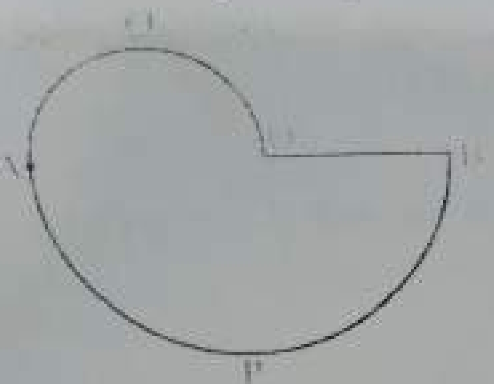
Age(in years)	No. of people rescued
10-20	9
20-30	14
30-40	15
40-50	21
50-60	23
60-70	12
70-80	6

Q27.(a) If -5 is a root of the quadratic equation $2x^2 + px - 15 = 0$ and the quadratic equation $p(x^2 + x) + k = 0$ has equal roots, then find the value of k. 3

OR

(b) The sum of two numbers is 15. If the sum of their reciprocals is $\frac{3}{10}$, then find the two numbers. 3

Q28. In the given figure, APB and AQO are semi-circles and AO = OB. If the perimeter of the given figure is 40 cm, then find the area of the shaded region. 3



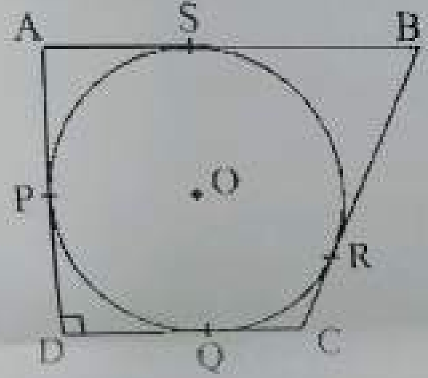
Q29. A toy is in the shape of a right circular cylinder with a hemisphere on one end and a cone on the other. The height and radius of the cylindrical part are 13 cm and 5 cm respectively. The radii of the hemispherical and conical parts are the same as that of the cylindrical part. Calculate the surface area of the toy if the height of the conical part is 12 cm. 3

30.(a) Using Fundamental Theorem of Arithmetic, find the LCM and the HCF of 816 and 170. 3

OR

(b) National Art convention got registrations from students from all parts of the country, of which 60 are interested in music, 84 are interested in dance and 108 students are interested in handicrafts. For optimum cultural exchange, organisers wish to keep them in minimum number of groups such that each group consists of students interested in the same artform and the number of students in each group is the same. Find the number of students in each group. Find the number of groups in each art form. How many rooms are required if each group will be allotted a room? 3

Q31. A circle with centre O and radius 8 cm is inscribed in a quadrilateral ABCD in which P, Q, R, and S are the points of contact as shown. If AD is perpendicular to DC, BC = 30 cm and BS = 24 cm, then find the length DC. 3



SECTION – D

This section consists of 4 questions of 5 marks each.

Q32.(a) D is the point on the side BC of a triangle ABC such that $\angle ADC = \angle BAC$, prove that $CA^2 = (CB)(CD)$ 5

OR

(b) If AD and PM are medians of triangles ABC and PQR respectively where $\Delta ABC \sim \Delta PQR$, prove that $\frac{AB}{PQ} = \frac{AD}{PM}$. 5

Q33. In a class test, marks obtained by 120 students are given in the following frequency distribution table. If it is given that mean is 59, then find the missing frequencies x and y.

Marks	No. of Students
0-10	1
10-20	3
20-30	7
30-40	10
40-50	15
50-60	x
60-70	9
70-80	27
80-90	18
90-100	y

Q34. Along a road lie an odd number of stones placed at intervals of 10 metres. These stones have to be assembled around the middle stone. A person can carry only one stone at a time. A man carried the job with one of the end stones by carrying them in succession. In carrying all the stones he covered a distance of 3 km. Find the number of stones. 5

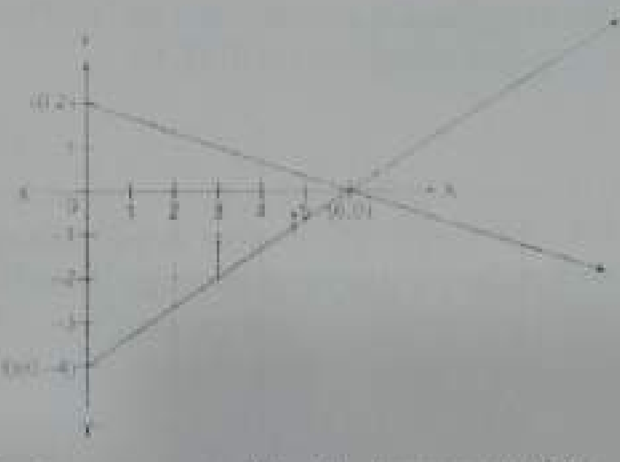
Q35. $\frac{\cos A}{1-\tan A}+\frac{\sin A}{1-\cot A}=\sin A+\cos A$ 5

SECTION – E

This section consists of 3 case based questions of 4 marks each.

Q36. **Case Study 1.**

The blades of the scissors are represented by the graph of linear equations $x + 3y = 6$ and $2x - 3y = 12$



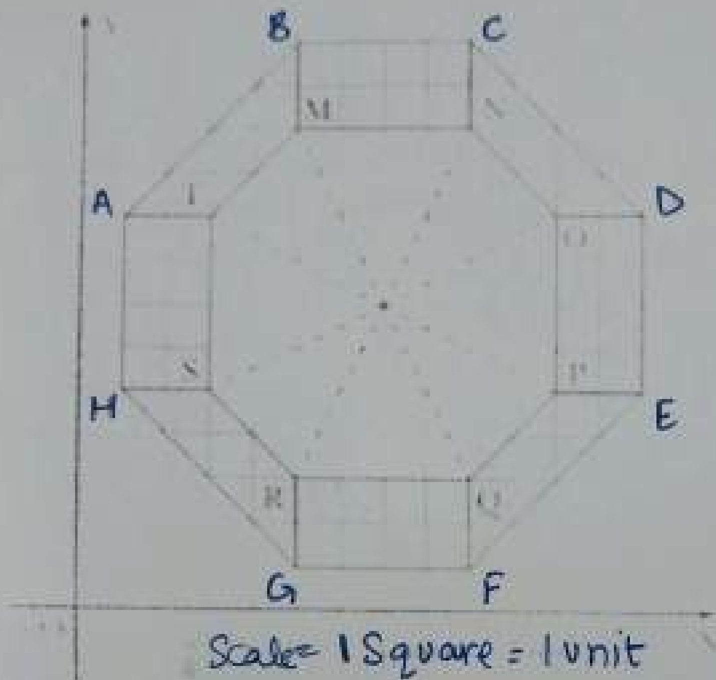
(i) Find the point of intersection of the blades represented by the linear equation $x + 3y = 6$ and $2x - 3y = 12$ of the scissor. 1

(ii) Find the points at which linear equations $x + 3y = 6$ and $2x - 3y = 12$ intersects y-axis. 1

(iii) If (1, 2) is the solution of linear equations $ax + y = 3$ and $2x + by = 12$, then find the values of a and b respectively. 2

Q37. **Case Study 2:**

The top of the table is shown in the given figure.

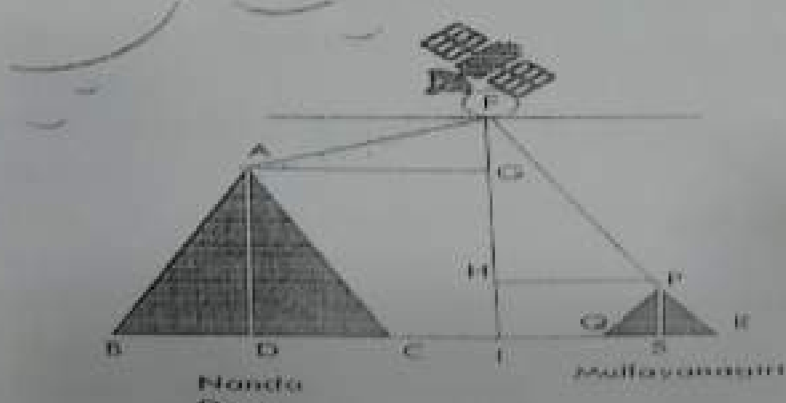


(i) Find the distance between the points A and B. 2

(ii) Find the coordinates of the midpoint of the line joining points M and Q. 2

Q38. **Case Study 3:**

A Satellite flying at height h is watching the top of the two tallest mountains in Uttarakhand and Karnataka, them being Nanda Devi(height 7,816m) and Mullayanagiri (height 1,930 m). The angles of depression from the satellite, to the top of Nanda Devi and Mullayanagiri are 30° and 60° respectively. If the distance between the peaks of the two mountains is 1937 km, and the satellite is vertically above the midpoint of the distance between the two mountains.



Based on the above information, answer the following questions:

(i) Find the distance of the satellite from the top of Nanda Devi. 1

(ii) Find the distance of the satellite from the top of Mullayanagiri. 1

(iii) What is the angle of elevation if a man is standing at a distance of 7816m from Nanda Devi? 2

OR

If a mile stone very far away from, makes 45° to the top of Mullanyangiri mountain , then find the distance of this mile stone from the mountain.